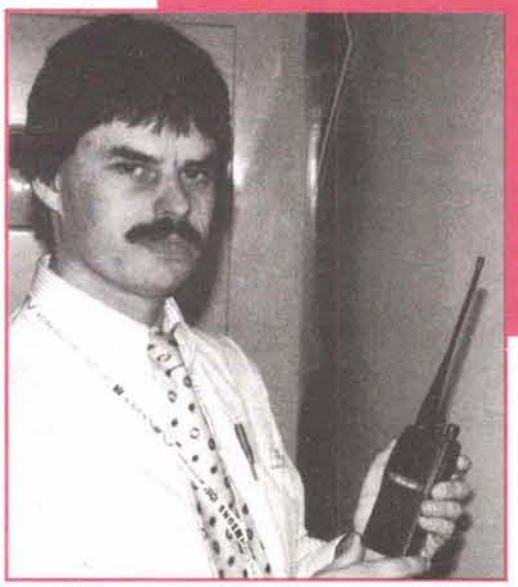
by Gordon West

MULTI-USE RADIO SERVICE SPARKS CHEERS AND FEARS

Maxon "Tru-Talk" two-watt MURS Radio (awaiting FCC certification).

Author West looks at the new Maxon MURS five-channel radio. Maxon will also sell a MURS repeater, too.

Kenwood displays what their MURS radio — under development — may look like.



New Midland MURS radio — will it cut through undisciplined chatter?

It's now on the air — the Federal Communications Commission's (FCC) new Multi-Use Radio Service offering five prime VHF channels with absolutely no licensing requirement.

Portable two-way radio manufacturers are enthusiastic about the prospect of selling thousands of two-watt HTs into this new market. The FCC is pleased that it no longer must enforce licensing rules on those handheld business band radios seen selling at most retail outlets with color-coded frequency "dots." Prospective radio users who needed more than a five-block range from Family Radio Service (FRS) sets are standing in line for the new VHF MURS transceivers that might easily cover an entire city or county with a well-elevated antenna system, or even a several-hundred-mile region if rigged up into a repeater configuration from a high mountain top or building.

The licensed amateur radio community is taking a precautionary "let's wait and see" stance on whether or not this new license-free radio service might positively contribute to license-required amateur radio recruitment, or cause a negative impact on the amateur radio nearby two-meter band where the more savvy MURS no-license user might purchase two-meter 144 MHz-148 MHz linear amplifiers and use them up on the 152 MHz and 154 MHz region with less than a spectrally clean signal, well beyond signal purity and FCC rules banning linear amplifiers from the brand new MURS frequencies.

Amateur operators are also concerned about the new MURS channels that fall under "Citizens Band," and the recent legislation signed by former President Clinton that now

NEW MURS RULES TOO LOOSE?

There is a 30-day official petition reconsideration period that follows any Federal Communications Commission (FCC) Report and Order. The FCC released the MURS Report and Order on October 13, 2000, and within a month both Motorola and the Personal Radio Steering Group announced their concerns that the loose MURS rules could be detrimental to an orderly development of the new multi-use radio service.

Motorola has raised the issue of telephone interconnection by MURS operators. Talk about a long-range cordless telephone — just imagine a two-watt VHF "phone patch" that could let you simultaneously talk and listen over distances of several miles, all from your own home phone. This could probably work for the first year with light MURS frequency loading, but I wouldn't try it myself because someone would probably figure out how to access my MURS phone patch, and start dialing their in-laws in Europe on my nickel. No thank you — I'll stick with my "el cheapo" $49.95 900 MHz phone, thank you!

Motorola is also under possible pressure by present licensed low-power radio users on these existing channels. Motorola suggests that the FCC limit the MURS service strictly for low-power industrial and business radio use.

Motorola may also be concerned that MURS users would integrate their VHF equipment into the UHF Family Radio Service (FRS), and develop some elaborate linking systems not envisioned in the new MURS rules. With such a wide separation of frequencies from 150 MHz to 462 MHz, I could see plenty of crossband applications all in one nice, neat, integrated set. But the FCC, to my knowledge, hasn't officially certified any new MURS radio as of this writing, so quite possibly strict certification rules could prohibit a MURS handheld or mobile radio having capability of the inclusion of a UHF FRS board in it. Or linked to it. Or sandwiched beside it!

While it seems strange that Motorola would like to see the MURS rulemaking halted, Motorola is probably going to be the first with a new five-channel, two-watt, MURS transceiver. Or maybe it will be a four-watt transceiver with a -3 dB short rubber duck antenna, giving out two watts ERP, huh?

The Personal Radio Steering Group, run by Corwin Moore WB8UPM, raises the question that I, too, have been asking, on what the FCC indicates as two watts effective radiated power output. I have been told by Don Henry of Shakespeare Antenna Company that ERP rules are somewhat common for some European seacoast radio systems, and the intent of the FCC rules is to place more attention on no-more-than-two watts ERP at the antenna than power levels at the equipment end of the coax. Shakespeare Antenna Company will carefully analyze the MURS market; and when things settle down, Shakespeare marine antennas at 156 MHz could make some dandy MURS base station white fiberglass antenna systems providing the MURS operator checks out coax losses and power output limits to insure no more than two watts ERP.

And then comes the marketing questions about how different antenna manufacturers rate the gain of their antennas. EIA specs gain over a dipole, dBD. But sometimes we see antenna gains calculated to dBi, gain over an isotropic radiator — two dBi really equating to zero dBD gain on a dipole. Wowsers, I can see some real gain playing when MURS operators begin to calculate what they can do to improve their remote antenna coverage.

The Personal Radio Steering Group also questions the rather lax rules that could allow ham-like base-station-to-base-station communications, ham-like repeater communications, and ham-like phone patch.

The Personal Radio Steering Group is well-respected in all it has tried to do to keep GMRS orderly and in control. Their concern, as well as this author's own concern, is that the extra loose MURS rules published in the FCC Report and Order could lead to city-wide channel chaos, rendering the useful range of MURS handhelds to just a few blocks before someone else's well-elevated phone patch causes capture effect limiting any meaningful increase in range over that of a little, inexpensive, half-watt, FRS UHF unit.

But then again, these five channels have already been taken over by unlicensed users, and maybe some fast food operation already on some of the color dot frequencies will be able to cash in and allow MURS users to radio dispatch the next burger to their home by the local burger wagon monitoring the MURS burger channel. Yes, indeed, the FCC truly needs to study all of the reconsideration comments that ask why the MURS rules have been written so loose.

allows state and local officials to have equal enforcement rights like the FCC to clamp down on any signal that could interfere with your next door neighbor's television, radio, or cordless phone. Licensed hams with little two-meter handheld transceivers don't want to be confused with non-licensed MURS users on an adjacent band of frequencies.

MURS FREQUENCIES:

151.820 MHz	15 kHz sandwich channel
151.880 MHz	15 kHz sandwich channel
151.940 MHz	15 kHz sandwich channel
154.570 MHz	Blue dot low-power channel
154.600 MHz	Green dot low-power channel

NOTE: The three 151.xxx new MURS frequencies were originally assigned to the industrial/business radio service, with a one-watt limitation. The remaining two 154.xxx MURS frequencies were also assigned to the industrial/business radio service, two watts output limitation.

The first three 151.xxx channels are brand new to FRS, and are spaced in between long-time existing business band frequencies 15 kHz higher and 15 kHz lower. These first three MURS 151.xxx channels would be considered "interstitial" to the existing business-band radio users running extremely powerful stations; 15 kHz separation will mean the first three channels could regularly experience "bleed over" from legitimate licensed business-band radio users.

The last two 154.xxx channels are literally packed with radio users right now — some one-watt, low-power, licensed legal users, and a huge number of unlicensed users who purchased "blue dot" and "green dot" handhelds through a mail order catalog or from their local chain store, and never bothered to fill out the appropriate FCC business-band license paperwork. These same channels might also have your local fast food chain barking out orders to the kitchen, and squawking to the drive-thru customers about ketchup or mustard to go along with a large order of fries.

So, we now know that the 151 MHz channels — all three of them — will initially be relatively quiet as opposed to the two 154 MHz channels that are already filled with low-power chatter.

MURS on VHF will outperform FRS on UHF by miles!

SO HOW MUCH POWER?

The new FCC Rule 95.639(g) limits a certified MURS unit not to exceed two watts of effective radiated power (ERP). Each MURS unit must be certified in accordance with FCC Rule 90.203, and no MURS unit will receive official certification if it is somehow capable of any higher power output.

But I question how they are going to accurately measure effective radiated power — think about a handheld, VHF, two-way radio that might put out four watts on a Bird wattmeter, coupled directly to the antenna jack, but the extremely short "rubber duck" antenna resulting in 3 dB loss results in half-power output, or two watts effective radiated power. Since effective radiated power is dependent on antenna gain and coax loss, it seems to me that it is

First Class A CB, then 27MHz, and then GMRS, then FRS, and now MURS!

going to be tough to calculate ERP just by the transceiver alone.

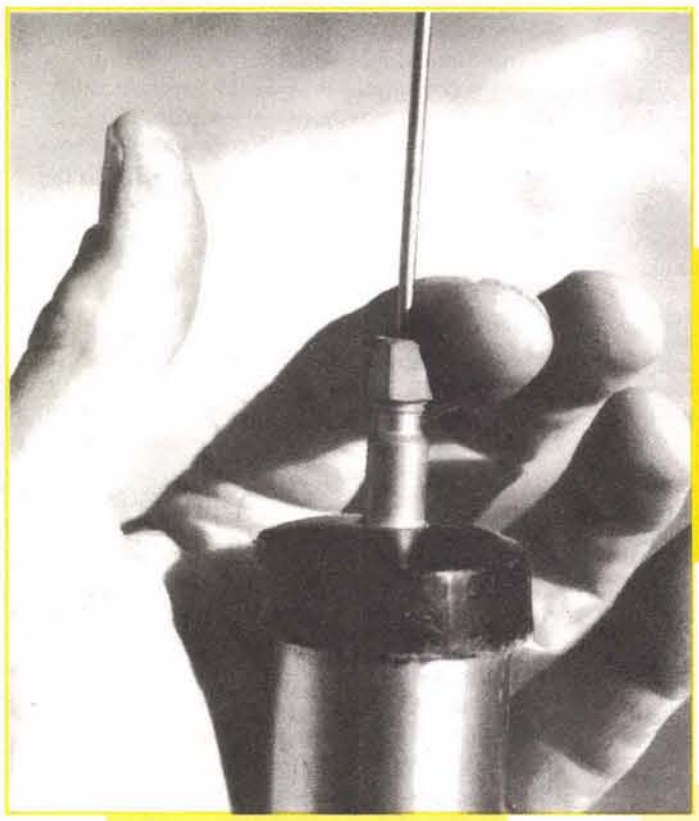
The rules also call for reduced deviation from what we presently hear on the normal 30 kHz separated business band channels. Instead of ±5 kHz of deviation, the rules call for ±2.5 kHz deviation. This will make the audio on MURS equipment sounding dramatically softer if you are scanning both regular business-band channels and MURS channels.

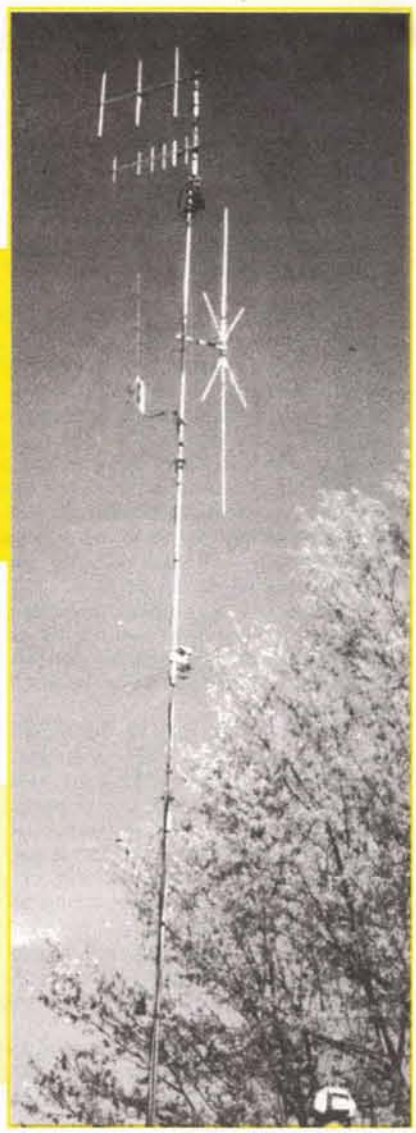
ALL YOU CAN DO

Almost anything goes on the new MURS channels. FCC Rule 95.1307 permits voice, data, slow-scan television, radio control, and zero rules about the content of your messaging. This means you could use MURS equipment to dispatch delivery trucks, gab to other same-channel users about everything and anything, operate your little MURS handheld as a long-range baby monitor (except on 154.600 where no continuous carrier is allowed), or use it as a long-range super cordless telephone. Hooking your MURS radio up to the telephone system is not specifically prohibited.

MURS technical types could easily buy a 151 MHz and 154 MHz unit, interconnect a simple carrier or VOX circuit, hook both units up to a pair of ground plane antennas separated by at least 50 feet, and run on these two channels as an automatic repeater station. Well-respected radio activist Corwin Moore of the Personal Radio Steering Group (www.provide.net/~prsg) comments, "This could become a completely unmanageable monster," referring to the new MURS frequencies.

The FCC comments in their report and order, "*... We agree with the commentors that because of the manner in which manufacturers have chosen to market radios that operate on these frequencies and our elimination of the frequency coordination requirements on the low-power frequencies, it would be in the public interest to eliminate the licensing requirements for them.*" In other words, since these frequencies are already overrun with illegal users (green dot and blue dot), go ahead and just give them the band!





MURS radios may be tied into an outside antenna system for extended range (two-watt ERP limit).

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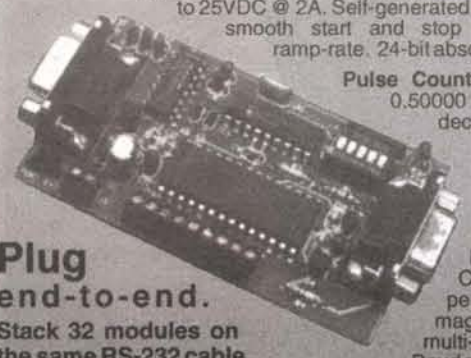

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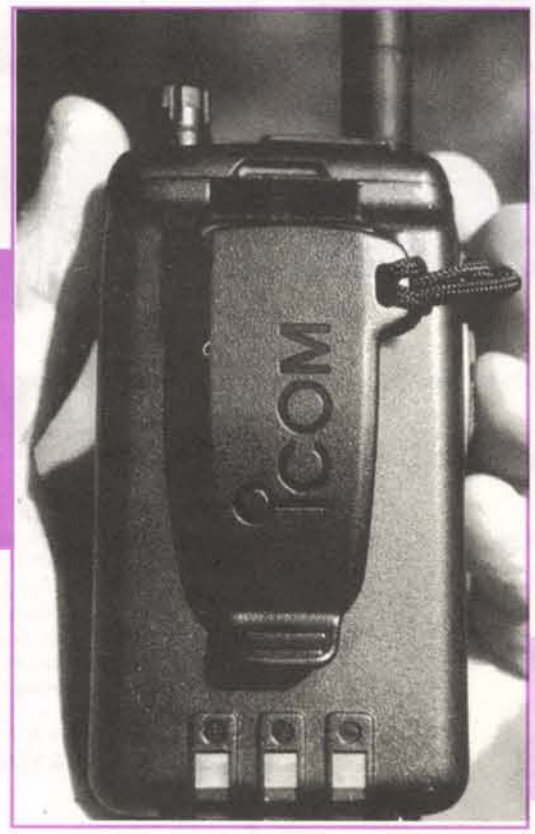

What will the MURS radio look like? Here is a peek!

out about amateur radio two-meter amplifiers that easily work at 152 and 154 MHz from their normal 146 MHz tuned position, powerful signals will dominate the different channels, and dedicated MURS users will then resort to directional beam antennas to help cancel the clutter.

In five years, I anticipate the five MURS channels talking not much further than FRS due to channel loading in metropolitan areas. But take your little MURS handhelds out on the secluded lakes, or up in the mountains, and you'll begin to enjoy the 5 to 10 mile range that two-watt MURS equipment was designed to deliver.

And chances are, out in the open and away from a high concentration of MURS users, things will be quite fine.

Some radio experts view MURS as the new VHF Citizens Band and also see it as a much more powerful way to communicate than presently over the little tiny half-watt FRS walkie-talkies. Keep in mind that a MURS radio may feature an antenna jack that could allow users to hook into a well-elevated antenna system to further their line-of-sight range.

Two watts of effective radiated power is more than enough to travel several hundred miles on a line-of-sight basis. If you just happen to live on top of a big mountain, or operate your MURS unit at the top of a skyscraper, you could easily make contact over 100 miles away.

But if you're going to play "DX" (long range in "ham speak") communications, you better hop on the band wagon right now while the channels are relatively clear. Just as soon as the five MURS channels begin to load up with users, none needing call signs or FCC registration, the ultimate range will begin to shrink dramatically due to same-channel interference. And once MURS users find

Radio expert Chuck Gysi writes, "Extended range would be offered as a two-watt repeater and an antenna at the right elevation." Rich Moseson W2VU, of *CQ Magazine* comments, "MURS could have a tremendous impact on amateur radio. Those who like what MURS offers, but are frustrated with its limitations or crowding, will become prime recruits for ham radio."

If you have a scanner, try tuning into the five frequencies now assigned for MURS. Listen to a completely new radio service that may grow into a powerful and valuable short-range VHF Citizens Band service with a purpose. Let's hope MURS may extend the range and endless communication possibilities that FRS was not able to offer. Just the idea of almost any type of emission permitted on MURS gives these five new frequencies some real possibilities. **NV**

MURS radios could be tied into GPS positioning.

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